A Government-Sponsored Foreign Exchange Hedging Facility for Renewable Energy

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Access to cheaper foreign debt is needed for India's renewable energy targets

- Two key finance barriers:

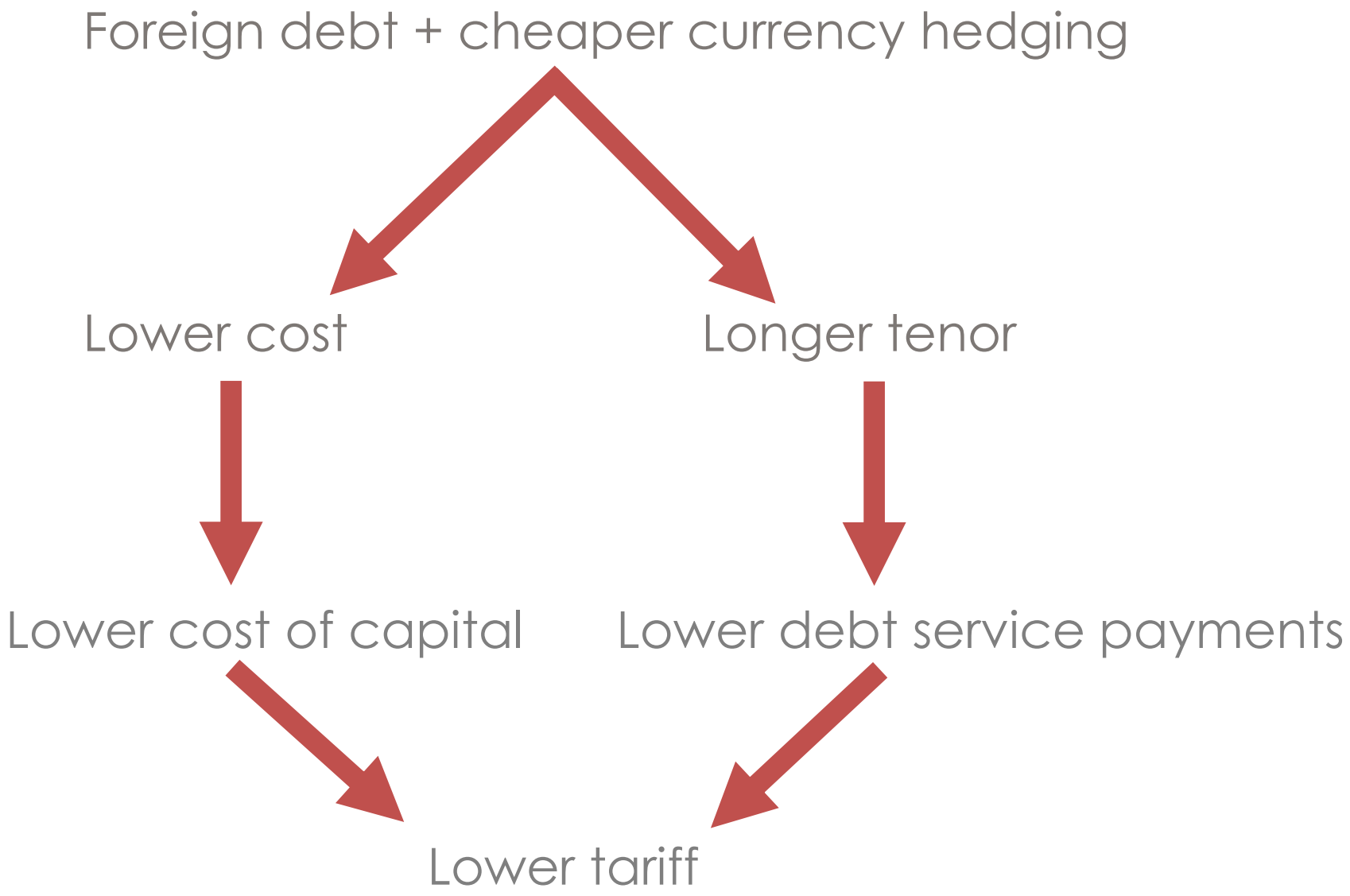
  1 a shortage of debt

  2 inferior terms of debt

- Domestic debt is high cost and short tenor, and adds **30%** to the cost of renewable energy.

- Foreign debt: more debt and a cheaper source of capital. BUT a market-based currency hedge can make it as expensive as domestic debt.

Reducing the currency hedging cost



A government-sponsored FX hedging facility could be a cheaper hedging mechanism. A government might want to bear currency risk because:

1. Government influence on macroeconomic conditions and thus currency rates

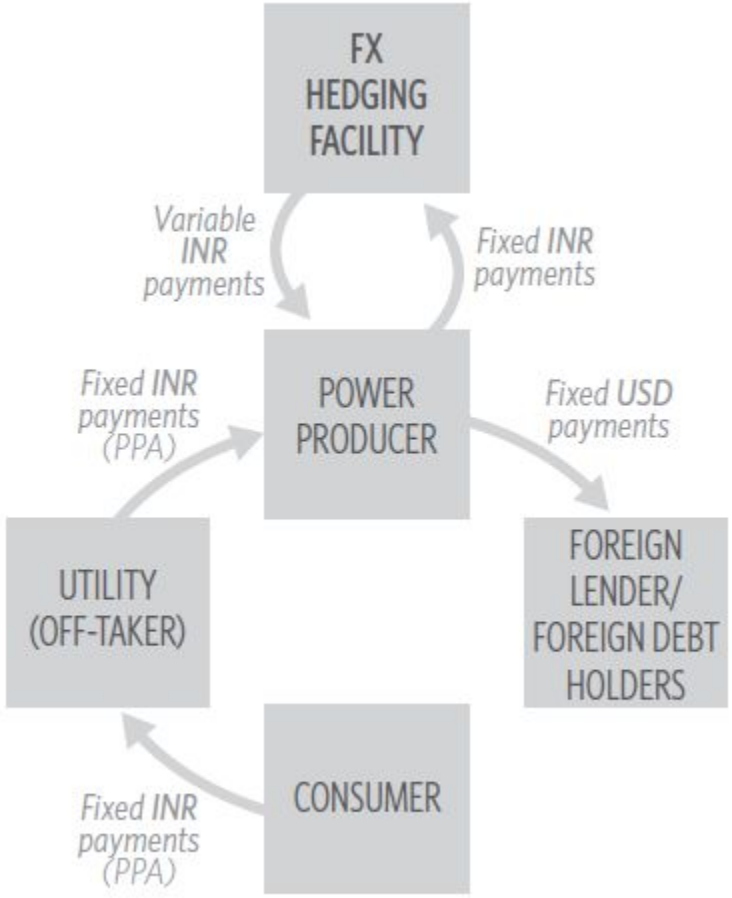
2. It could offset currency risk associated with future imported fossil fuel purchases

However, the design of the facility needs to be carefully considered, given that currency movements can be uncertain and volatile.

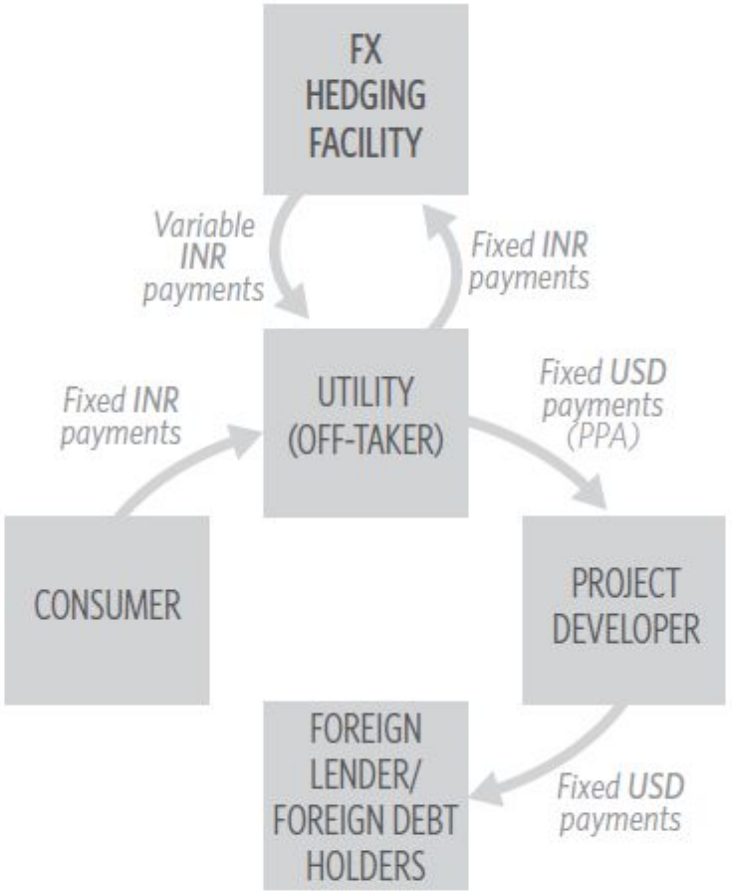
What are the expected costs and risks and how can the government cover unexpected currency movements?

The facility can work with two types of power purchase agreements

Local currency PPA



Dollar-linked PPA



We mostly analyze the local currency PPA

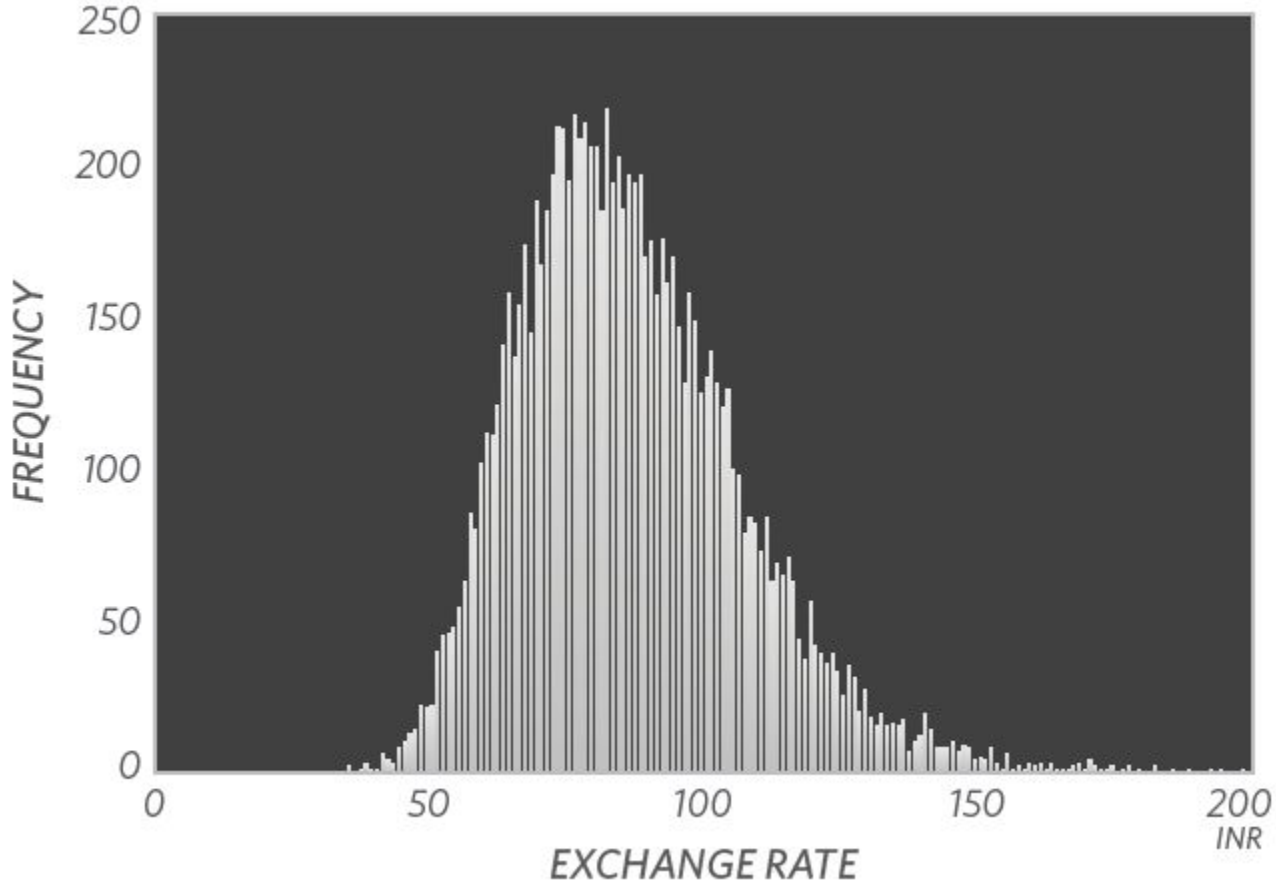
Designing a foreign exchange hedging facility

- Expected cost
- Risk exposure
- Capital buffer
- Size

Expected costs

Monte Carlo simulations to determine design parameters

10000 simulations per year



Forecasting the foreign exchange rate

Year	Maximum USD-INR foreign exchange under different probability levels (in INR)			
	P50	P75	P85	P95
2015	65.04	68.29	70.03	72.95
2016	67.16	71.9	74.45	78.73
2017	69.33	75.35	78.58	84
2018	71.58	78.77	82.63	89.11
2019	73.91	82.22	86.68	94.17
2020	76.31	85.72	90.78	99.27
2021	78.78	89.3	94.45	104.44
2022	81.34	92.97	99.22	109.71
2023	83.98	96.74	103.59	115.1
2024	86.7	100.62	108.09	120.64

The expected hedging cost from the facility can be 50% cheaper than the market cost.

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Fixed payments from counterparty to FXHF (A)	83.79	83.79	83.79	83.79	83.79	83.79	83.79	83.79	83.79	83.79
Expected foreign exchange rate	65.04	67.16	69.33	71.58	73.91	76.31	78.78	81.34	83.98	86.7
Expected variable payments by FXHF to counterparty (B)	86.5	89.32	92.21	95.2	98.3	101.49	104.78	108.18	111.69	115.31
Expected net payments by FXHF to counterparty (B-A)	2.71	5.53	8.42	11.41	14.51	17.7	20.99	24.39	27.9	31.52

The expected hedging cost for a government-sponsored facility is 3.5% points. This is 50% cheaper than a market-based hedge.

The facility can reduce the cost of renewable energy by up to 19%.

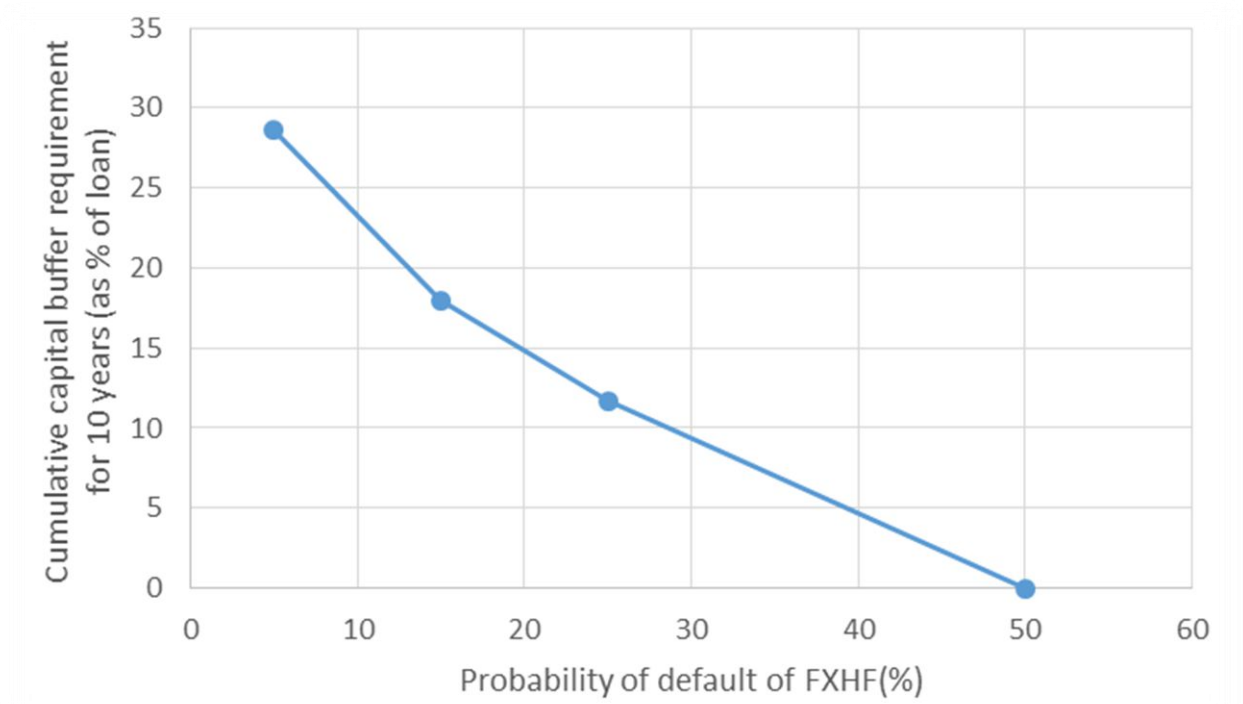
Power purchase agreement	Scenario	Net cost of debt to project developer	Approximate reduction in delivered cost of renewable energy
Local currency	Expected cost of FXHF is borne by the government	5.50%	19%
	Expected cost of FXHF is passed onto the project developer	9.00%	8.5%
Hard currency	Expected cost of FXHF is borne by the government	5.50%	19%
	Expected cost of FXHF is passed onto to the off-taker	5.50%	9.8%

Risk considerations

However the facility needs to manage the risk of unexpected currency movements

- Currency movements can be volatile and extreme.
- The expected cost of the FX hedging facility covers expected currency movements, but may not cover unexpected currency movements.
- One way to protect against unexpected currency movements is through a capital buffer, which can work in tandem with a sovereign guarantee

The size of capital buffer increases with risk coverage



However ,a capital buffer may need to be large, with the size growing with higher risk coverage.

For example, to reach India's sovereign credit rating of BBB-, which is the gold standard for foreign lenders, the buffer needs to be approximately 30% of the original loan.

The size of the capital buffer may need to be large: 30% of the loan size to reach BBB-

- The government cost can be zero if invested in a risk-free security.
- The expected cost of the FX hedging facility, of 3.5 percentage points, does not take into account the cost of maintaining a capital buffer.
- The market would charge 2.76 percentage points to maintain a capital buffer.

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